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MiniCom Guardian

User Manual

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2 Revision History

Date	Version	Signature	Description
2009.02.18	A	ØK	Initial version.

3 What does my Guardian do?

Congratulations with you MiniCom Guardian. Once the Guardian is installed with a SIM card, a Guardian sensor, and a power supply, you will be able to:

- Monitor external power supply
- Monitor environment temperature
- Monitor relative humidity
- Easily get current status on SMS
- Perform all configuration using SMS
- Get alarm notifications on SMS with status when monitored values cross given limits
  E.g. “Temperature is too high”
- Get notification when an alarm is reset
  E.g. “Main power OK.”
- Register up to 4 notification recipients

The backup battery and GSM module makes sure you will always get the relevant notifications from the Guardian, and the system does not rely upon any other infrastructure than the GSM network.

4 Installation

4.1 Preparations

4.1.1 Get a SIM card

Before you begin, you must make sure you have a valid SIM card to use with the MiniCom Guardian. You must also make sure the GSM coverage is good enough (at least two points of coverage on your mobile phone, using the same operator). If the coverage is not good enough, it is possible to connect an external antenna and to try different locations in order to retrive the best signal.

NOTE: We recommend getting a SIM card with a special “alarm” or “data only” subscription. These subscriptions are cheeper and no not support speech. This way, the SIM card is less likely to be a subject for unauthorised use.

4.1.2 Prepare power supply

Please make sure that you connect the power supply to the power you want to be monitored. If a UPS is involved, you should make sure the power is connected to the same source as the UPS, so you get an early warning if the main power fails before the UPS runs out of battery.

4.1.3 Plan location for sensor and MiniCom

Plan the location where you want the sensor and MiniCom to be installed, and make sure you have the correct cable lengths. If longer sensor cables are required, you can use a regular patch cable with RJ45 connectors (maximum 20 meters).

4.1.4 Determine alarm limits

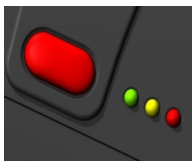
Consult with the recommendations for the preferable temperature and humidity ranges in the environment to be monitored.

4.2 Physical installation

Install the Guardian control unit in a dry indoor environment.

1. Remove the front cover, and insert the SIM card into your Guardian control unit (located in the battery compartment).
2. Make sure the SIM-lid is properly mounted. (Slide forward and you should hear a click.)
3. Mount the battery plug, and fit the battery into the slot.
4. Mount the DIN rail with screws or two folded tapes where you decide to mount your Guardian.
5. Mount your Guardian control unit onto the DIN rail
6. Mount the sensor (the blue box) at the location to be monitored.
7. Attach the sensor to the Guardian control unit in the left hand socket by using the blue CAT5 patch cable.
8. Connect the power supply to the right hand socket of the Guardian.
   Important: Connect your Guardian to the same power outlet as your UPS or server is connected to.

4.3 Enter PIN code



When the Guardian is started with a SIM-card for the first time, and the PIN code is enabled, it will ask for a PIN code with a sequence of audio signals (PIN code is only requested for the first start up).

- Enter the PIN code using the red button. Each digit is entered by pressing the button the corresponding number of times (1= 1 push, 5= 5 pushes and 0= 10 pushes). Each digit will be repeated from Guardian before the next digit can be registered.

When all 4 digits are registered, you will hear an acknowledge signal, and the MiniCom will restart and attempt to use the new PIN code. If the PIN code is accepted the MiniCom will again reboot, and start normal operation (GSM connection is indicated by the yellow LED).
If the PIN code is wrong, the MiniCom will reboot and again ask for a new PIN code.

Please note: If you make a mistake, wait until you get the same sequence of signals (approximately 7 – 8 seconds) and start again. Alternatively you can press the red button for approximately 3 seconds until the MiniCom Guardian stops beeping. Now the MiniCom Guardian is ready for entering pin code again from beginning.

Please note: If you enter the wrong PIN code three times, and have to enter PUK code, we recommend inserting the SIM card in your mobile phone to enter the PUK-code. It is off course also possible to enter the PUK code directly on the MiniCom Guardian too.

4.4 Set date and time

If the system clock is set, you will be able to analyse the time and date of the latest 10 alarms. The MiniCom Guardian can be set up to automatically update itself with the correct date and time. In order to do this, you have to register the MiniCom phone number, so that the MiniCom Guardian is able to send SMS to itself.

Please send the following message (all commands are case insensitive):
`PH=`<phone number>

Example:
`PH=99887766`

Or international number:
`PH=+4799887766`

The MiniCom Guardian will immediately send an SMS to itself and keep the internal clock updated. By default, the updating process is repeated every month.

4.5 Configure id and alarm limits

The MiniCom Guardian is configured using simple SMS commands. Several commands may be sent as one single SMS separated by space (all commands are case insensitive).

Example:

```
ID=”Server room” MINTEMP=19 MAXTEMP=26.4 MINHUM=15 MAXHUM=57.5
```

This command sets the “name” of the Guardian to “Server room”, the minimum temperature limit to 19℃, the maximum temperature limit to 26.4℃, the relative humidity minimum limit to 15% and the relative humidity maximum limit to 57.5%. Please note that the ID requires double quotation marks (“ “) if the string includes spaces. Decimal separator is set by uning a dot and not comma.

Send the configuration commands to the Guardian phone number as shown in the example (see section 6.2.4).
Send a SMS to the MiniCom Guardian with the message: config

The command results in the following response from Guardian:

```
Server room:
Temp: 23.8’C   (min:19 max:26.4)
Humidity: 42%  (min:15 max:57.5)
No active alarms
```

followed by a second response from the MiniCom Guardian:

```
MID=<MiniCom ID> OK
```

The MiniCom ID is the serial number labelled at the back of your Guardian. The “OK” is an acknowledgement that the commands have been accepted. If anything was erroneous, you will get the “ERROR” response as described in section 6.1.4.2.

The next section describes how to subscribe for alarm notifications.

4.6 Subscribe for notifications

Up to 4 phone numbers can be set up to subscribe for alarm notifications from MiniCom Guardian.
Each of the 4 numbers can be set using the PHN command (all commands are case insensitive).

Example, setting the number at position 3 (of 4) to the phone number, “12345678” (space only between the commands):

```
PHN=3,12345678
```

Example, setting an international number at position 1:

```
PHN=1,+4712345678
```

5 Getting information

5.1 Checking status information (INFO)

5.1.1 Sending SMS

Send `INFO` in a SMS to MiniCom Guardian, to get the current status information and a list of active alarms in a user friendly format.
Please see the description of the `INFO` command for more details (See section 6.2.5)).

5.1.2 Pressing button for 5 seconds

Press the button for 5 seconds until you hear a beep, to send and INFO report to all defined SMS subscribers (Please see “Subscribe for notifications” in section 4.6).

5.2 Getting current configuration (config)

See `CONFIG` in a SMS to MiniCom Guardian, to get current configuration. See section 6.2.4)

5.3 Analysing detailed status (STATUS)

Send `STATUS` to get detailed status information including historic and active alarms. The difference between the STATUS report and INFO report, is that the STATUS report is more compact and includes the last 10 alarms (historic and active) with timestamp and duration. This can be useful for analysis after an alarm situation.

Please see the description of the `INFO` command for more details (see section 6.2.3).

5.4 Alarm behaviour and notifications

When an alarm is triggered, the alarm is marked with a time stamp, and the associated notification message is sent to the given SMS recipients (as described in section 4.6).

Typical notification message:

```
Main power missing.

Server room:
Temp: 23,8’C   (min:19 max:26)
Humidity: 42%  (min:15 max:57)
Active alarms: NOPOWER
```

The system can trigger a number of different alarms divided into the following categories:

5.4.1 Value limit exceeded

If a value exceeds a given limit, the associated alarm triggers immediately. The alarm is automatically reset when the value resturns on the valid side of the limit, with a given margin (hysteresis). The default hysteresis values are 1 °C (HYSTEMP) and 5% (HYSHUM).

Example:
If the MAXTEMP limit is set to 30 °C, the MAXTEMP alarm triggers when the temperature exceeds 30 °C. If the temperature is then lowered to 29.1 °C, the alarm is not reset, because the hysteresis (HYSTEMP) is set to 1 °C. When the temperature falls to 29.0 °C, the alarm is reset.

5.4.2 Power and battery alarms

A power loss (NOPOWER) is detected within shortest possible time (within 10 seconds). If you want the alarm to be triggered after XX minutes, you must set PTIME=XX.
When the backup battery voltage runs below the required voltage, the GSMSHUT alarm notification is triggered, and the modem is turned off. The MiniCom Guradian continues to run on battery for several hours more, to keep the alarm history and

continue monitoring. When the main power returns, the battery must be charged for a few minutes before the GSM modem is automatically turned on and the subscribers are notified with the recovery.

5.4.3 Battery change reminder (CHANGEBATT)

Every 2 years, the backup battery should be replaced, in order to maintain the best quality. A CHANGEBATT alarm is then triggered and notified by MiniCom, and the notification is then repeated every next 3 months.

Please note: MiniCom detects a battery change only if the main power remains on while changing the battery. This way you will not turn off the MiniCom while changing battery and the alarm history is maintained in memory.

5.4.4 Battery test

If you would like to test the backup battery capacity, you should do as follows:

- Make a note of current time and unplug the MiniCom Guardian main power supply.
- Wait for the MiniCom Guardian to send the alarm GSMSHUT (see section 7).
- If the GSMSHUT alarm is not received within 60 minutes the battery is OK and the MiniCom Guardian main power supply can be connected again.
- If you receive the GSMSHUT alarm within 60 minutes, you should consider too order a new battery from 4tech.

5.4.5 System alarms

The MiniCom guardian continuously monitors the internal hardware and reports any detected faults, so that action can be taken If a system error occurs

6 Command interface

6.1 General format

This section describes the standard protocol for communicating with the MiniCom.
The protocol is based on a small command format to minimise the traffic and to simplify configuration through SMS.

6.1.1 Behaviour

A series of commands can be executed at once, by separating them with space (all commands are case insensitive).

There are 2 different command types:

- Non-Request commands: Commands not demanding information back to the sender, such as set up commands. Only an OK or ERROR acknowledge is returned.
- Request commands: Commands demanding information back to the sender, such as asking for the current configuration or status.

6.1.2 Syntax

Entity	Definition
Command string	<Command>{<SP><Command>}<EOM>
Command	<Command Name>[=<Param>{,<Param>}]
Command Name	Sequence of capital characters A..Z (not case sensitive)
SP	Space character (0x32)
EOM	End of message (SMS). <CR><LF> (Othervise).
Param	<Value>{,<Value>}
<Value>	<TimeStamp>|<String>|<Float>|<Bool>

Example command string:
```
MAXHUM=80 MAXTEMP=31 ID="The server room"
```

This command string contains 3 commands. The commands are executed sequentially. First the limit for maximum humidity is set to 80%. Then the limit for maximum temperature is set to 31℃. At last the ID string is set to "The server room". Please note that the ID string had to be placed in double quotes in order to be interpreted inside the same command. Avoiding doing so will result in an error, and the ID would have been set to "The".

6.1.3 Types

The command parameters are of different types as shown in the table below. These types are referred in the respective command descriptions.

Name	Format	Max/Min	Ex
<Timestamp>	yymmddhhmmss	0000 00000000 991231235959	040101121245 means 1. January 2004 at 12:12:45
<Float>	Decimal : 7 bits Exponent: 8 bits Mantissa: 23 bits	±1.18E-38 ±3.39E+38	12.45
<Integer>	16 bits	32767 -32768	1234
<String>	"{<Char>}" Quotation marks ("") may be omitted if there are no spaces in the string. Limited to 20 characters.	0x20 0x7F	"String with spaces" or Stringwithoutspaces
<Char>	ASCII character	0x20 0x7F	'B'
<Bool>	T = True F = False	T F	'T'

6.1.4 Acknowledge

All non request messages to the MiniCom returns an acknowledge message in return to the sender, indicating whether the command string was accepted, or if there were errors. The acknowledge is returned upon reception of the complete SMS-message or <CR><LF> if COM1 is used.

6.1.4.1 Positive response

If the message was accepted, a positive response is returned.
Format:
MID=<MID> OK
Example:
MID=MC1231231212 OK

The MID (MiniCom ID) is equal to the serial number of the MiniCom printed on the label at the back.

6.1.4.2 Negative response

If any command in a command string contains errors or cannot be executed, an error message is returned. Commands prior to the one that failed will be executed, while the remaining commands will be skipped.

Format:
MID=<MID> <ERROR>

Where
ERROR=<Cause>,<Command number>

Possible error causes:

Error cause	Description
ENCON	Configuration commands are not enabled. See the ENCON command
SYNTAX	Unknown syntax
CMD	Unknown command

The command number starts at 1 for the first command.

Example:

Command string:
MAXTEMP=Twenty degrees
Error message:
MID=MC1231231212 ERROR=SYNTAX,1

6.2 Configuration commands

6.2.1 Overview

The following table gives an overview of the most common commands. **None of these commands require the ENCON mode to be executed.**

The rest of this chapter defines all commands in more detail.

Command example	Description	Factory default value
ID	User text string used to identify the MiniCom.	
NOLIMITS	Reset all limits (min and max for temperature and humidity)	N/A
MAXTEMP=30.5	The maximum accepted temperature © before triggering the MAXTEMP alarm.	26
MINTEMP=-10	The minimum accepted temperature © before triggering the MINTEMP alarm.	18
MAXHUM=80	The maximum accepted humidity (% rel) before triggering the MAXTEMP alarm.	60
MINHUM=10	The minimum accepted humidity (% rel) before triggering the MINTEMP alarm.	10
HYSTEMP=2	The temperature alarm hysteresis. The temperature must fall HYSTEMP degrees under the MAXTEMP limit or over the MINTEMP limit in order for a triggered alarm to be cancelled.	1
HYSHUM=3	The humidity alarm hysteresis. The temperature must fall HYSHUM % under the MAXHUM limit or over the MINHUM limit in order for a triggered alarm to be cancelled.	5
PTIME=15	Number of minutes of missing power required for triggering the NOPOWER alarm.	0
PH=12345678 **Or** **PH=+4712345678**	Phone number to the MiniCom. Used to synchronise the system clock by sending SMS to itself.	
PHN=2,12345678 **Or** **PH=2,+4712345678**	Set the SMS subscriber at position 2 (of 4) to phone number “12345678”. (space only between commands)	
PHN=4,	Delete SMS subscriber at position 4.By changing digit (from 4 to 1-3) you can delete other SMS subscribers.	

Example:

ID=”Server room” NOLIMITS MAXTEMP=30 MAXHUM=73

6.2.2 All commands (all commands are case insensitive). Separate commands by space.

PIN — **Set modem pin code**

Format	`PIN=<pin code>`
Arguments	Pin code (string): Pin code of the inserted SIM-card.
Comment	The PIN code is normally registered upon startup as described in section 4.3.
Example	`PIN=8113`
Default value	(empty string)

ID — **Set external controller ID**

Format	`ID=<external id>`
Arguments	External id (string,max 19): ID string used to identify the MiniCom in INFO reports and notifications.
Comment	Remember to use double quotes if the ID contains a space character.
Example	`ID="Server room"`

PH — **Set the MiniCom phone number**

Format	`PH=<Phone number>`
Arguments	Phone number (string): Current number to the MiniCom.
Comment	This parameter is usually set by the server. Note that the correct time and date is only set automatically when this parameter is set correctly.

Example	`PH=48011888`
	Or
	`PH=+4712345678`

TU — **Set period for auto synchronising time**

Format	TU=<Update interval>
Arguments	Update interval (int): Number of hours between automatic synchronisation of system clock.
Comment	
Example	`TU=24`
Default value	770 (1 month in hours)

T — **Set system time**

Format	`T=<time stamp>`
Arguments	Timestamp: New system time.
Comment	See also TSYNK
Example	`T=090212121212`

TSYNK — **Synchronise system time**

Format	`TSYNK`
Arguments	None
Comment	Does only work if PH is set to the correct phone number. Sends an SMS to itself to extract the timestamp from the GSM-network. Measures the delay until the message is received and adds this delay to the timestamp in the message, to set the system time.
Example	`TSYNK`

NMSG — **Max number of SMS messages per day**

Format	NMSG=<number>
Arguments	Number <int>: Max number of messages per day.
Comment	
Example	`NMSG=20`
Default value	`100`

MAXTEMP **Set maximum temperature**

Format `MAXTEMP=<limit>`
Arguments Limit (float): Maximum temperature allowed before the MAXTEMP alarm is triggered.
Comment An INFO report is automatically triggered to show the new set of limits. ENCON mode is not required for setting this value.
Example `MAXTEMP=28.5`
Default value 26

MINTEMP **Set minimum temperature**

Format `MINTEMP=<limit>`
Arguments Limit (float): Minimum temperature allowed before the MINTEMP alarm is triggered.
Comment An INFO report is automatically triggered to show the new set of limits. ENCON mode is not required for setting this value.
Example `MINTEMP=-4`
Default value 18

HYSTEMP **Temperature hysteresis**

Format `HYSTEMP=<hysteresis>`
Arguments Hysteresis (float): Required margin on the valid side of the temperature limit, to reset an active temperature alarm.
Comment An INFO report is automatically triggered. ENCON mode is not required for setting this value.
Example `HYSTEMP=3`
Default value 1

MAXHUM **Set maximum relative humidity**

Format `MAXHUM=<limit>`
Arguments Limit (float): Maximum relative humidity allowed before the MAXHUM alarm is triggered.
Comment An INFO report is automatically triggered to show the new set of limits. ENCON mode is not required for setting this value.
Example `MAXHUM=55`
Default value 60

MINHUM **Set minimum relative humidity**

Format `MINHUM=<limit>`
Arguments Limit (float): Minimum relative humidity allowed before the MINHUM alarm is triggered.
Comment An INFO report is automatically triggered to show the new set of limits. ENCON mode is not required for setting this value.
Example `MINHUM=30`
Default value 10

HYSHUM **Humidity hysteresis**

Format `HYSHUM=<hysteresis>`
Arguments Hysteresis (float): Required margin on the valid side of the humidity limit, to reset an active humidity alarm.
Comment An INFO report is automatically triggered. ENCON mode is not required for setting this value.
Example `HYSHUM=2`
Default value 5

PTIME **NOPOWER lead time**

Format `PTIME=<delay>`
Arguments Delay (int): Delay in minutes applied before triggering a NOPOWER alarm after a power break is detected.
Comment An INFO report is automatically triggered. ENCON mode is not required for setting this value.
Example `PTIME=15`
Default value 0

NOLIMITS **Clear all alarm limits**

Format	`NOLIMITS`
Arguments	None
Comment	Sets MAXTEMP, MINTEMP, MAXHUM and MINHUM to 999 or -999 to indicate that they are not set.
Example	`NOLIMITS`
Default value	n/a

PHN **Set given notification phone number**

Format	`PHN=<pos>,<phone number> (no space)`
Arguments	Pos (int): Given notification position number 1-4 Phone number (string): Phone number to set at the given position. The number may include country code, including + or 00.
Comment	Empty string is regarded as not set.

Example	`PHN=2,12345678`
	Or international:
	`PHN=2,+4712345678`

Default value	Empty string on all numbers.

ENCON **Enable configuration**

Description	Enable change of configuration parameters, disable normal operation. Normal operation is restored by the REBOOT command.
Format	ENCON
Arguments	
Comment	The sender's phone number will be stored in PHL, reprecenting the last installer.
Example	`ENCON`

REBOOT **Reboot MiniCom**

Description	Reboots the MiniCom and returns to normal operation.
Format	REBOOT
Arguments	
Comment	Any previous ENCON mode will be cancelled, and normal operation restored. Essential configuration and status parameters will be stored for retrieval after reboot. When the command is executed, a reboot process starts by turning off all LEDS. The actual shutdown happens within maximum 4 minutes, indicated by 2 dark audio tones.
Example	`REBOOT`

RESET **Reset to factory defaults**

Format	RESET=<MID>
Arguments	Mid (string): The MiniCom identification string.
Comment	All data and configuration stored in the MiniCom will be lost.
Example	RESET=MC8974782327386

6.2.3 STATUS

STATUS **Get current temperature, humidity, last 10 alarms and firmware version.**

Format	STATUS
Arguments	n/a
Comment	Detailed status information.
Example	`STATUS`

Result

The result is a printout of the current status, including firmware version, system time, monitored values and alarms.

Elements:

- STAT: Start of status report
- MID: The MiniCom serial number
- VER: Firmware version
- T: System date and time (yymmddhhmmss)
- LP: The last programmed sequence number (increases every time the MiniCom reboots with a changed configuration). This makes it possible to detect unwanted configuration changes.
- TEMP: Current temperature in ℃
- HUM: Current relative humidity in %
- ENCON: Included if the MiniCom is in ENCON mode
- AL: Start of alarm section
- <ALARM name>=<time>-<duration>: The given alarm was activated at the given time, and was active for the given duration. If the duration is -1, the alarm is still active.
- ENDAL: End of alarm section.
- ENDSTAT: End of status report

Example

```
STAT
MID=MC123456789
VER=EM1.00,0
T=090216123820
LP=10
TEMP=22.8
HUM=17
AL
MAXTEMP=0902161125-1  (Please see description above)
MAXHUM=0902161125-1
NOSENSOR=0902161123-0
NOPOWER=0902161121--1
ENDAL
ENDSTAT
```

6.2.4 CONFIG

CONFIG **Get current configuration (except notification setup)**

Format	CONFIG
Arguments	n/a
Comment	If SMS is used, the reply may take several returned messages of max 140 characters, starting with MID. The order of the rest of the parameters is not defined, and might change. No result command must be split across messages. Last message ends with ENDCONF, to inform the receiver that all config has been returned. Note that lastConfigPhone is included in the message, in order to give a message to the installer from the server.
Example	`CONFIG`

Result

The result is a printout of all configuration details, represented as the corresponding setup commands.

Special elements:

- `CONF`: Start of configuration
- `MID`: The MiniCom serial number
- `VER`: The firmware version and configuration layout version
- `T`: Current date and time
- `ENCON`: Included if the MiniCom is in ENCON mode
- `LPD`: Date and time of the current configuration
- `LP`: The last programmed sequence number (increases every time the MiniCom reboots with a changed configuration)
- `ENDCONF`: End of configuration

Example

```
CONF
        MID=MC05040171152
        VER=EM1.00,0
        T=000101000548
        TU=770
        INST=090211085554
        LPD=000101001349
        LP=21
        PH=
        PHL=
        PIN=4321
        MAXTEMP=26.0
        MINTEMP=18.0
        HYSTEMP=1.0
        MAXHUM=60
        MINHUM=10
        HYSHUM=5.0
        PTIME=0
        NMSG=100
        ID=""
        PHN=1,12345678
        PHN=2,
        PHN=3,
        PHN=4,
ENDCONF
```

6.2.5 INFO

INFO	Get current temperature, humidity, min/max values and active alarms

Format INFO
Arguments n/a
Comment
Example INFO

Result

<ID>:
Temp: <Temperature>'C (max:xx min:yy)
Humidity: <Humidity>% (max:xx min:yy)
Active alarms: <Alarm list>

Only active alarms and active alarm limits are included.

Example

```
Bob's MiniCom:
Temp: 22.8'C  (max:30)
Humidity: 18%  (max:70)
No active alarms
```

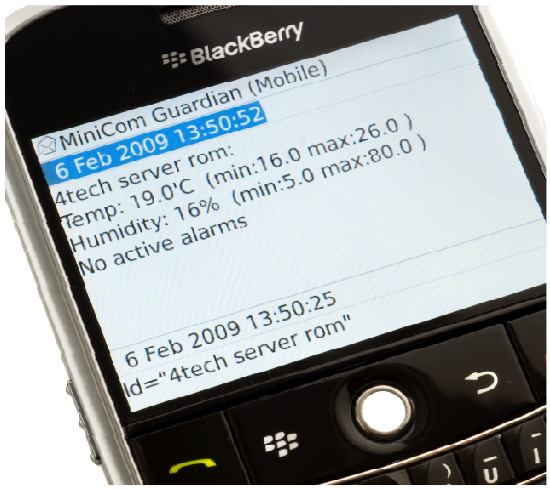
Comment

The INFO report is automatically included in all alarm notifications.
All subscribers will get the INFO report if the button is held for 5 seconds (when you hear a beep).

7 Events and alarms

Abbreviation	Description
BL	**Battery voltage to low.** Turning off MiniCom.
BNM	**Battery unmounted.** When BNM is reset (the battery is reinserted), the time for changing battery will be reset to 2 years.
CE	**System Error:** Error trying to charge batteries.
CH	**System Error:** Too high temperature to start charging batteries.
CHANGEBATT	**Battery needs to be changed (Note: Keep power on while changing).** Triggered automatically 2 years after last time a battery was inserted. The associated notification message will be resent every 3 months until the battery is remounted.
CL	**System Error:** Too low temperature to start charging batteries.
ERM	**System Error:** EEPROM error.
GSMD	**System Error: GSM error.** May occur when running without batteries, or when running very low on batteries.
GSMS	**System Error:** Signal strength too low for more than 30 minutes.
GSMSHUT	**Bat voltage too low, shutting down modem.**
GSMSMS	**System Error:** Error sending SMS. MiniCom retries sending an SMS up to 10 times. Every 3rd time, the GSM unit is restarted. This error occurs if an SMS has to be given up after the 10 retrials.
IVE	**System Error:** Internal voltage error
KPS	**Key pressed short.** Happens when an alarm is acknowledged using the button.
MANSHUT	**Turned off manually.** Triggered by holding the button down for 10 seconds (ignoring the beep after 5 seconds). If the power is still on, the MiniCom is just restarted.
MAXHUM	**Humidity is above max limit.** The alarm will be reset when the relative humidity falls below the limit with the margin given by HYSHUM (5% by default).
MAXTEMP	**Temperature is above max limit.** The alarm will be reset when the temperature falls below the limit with the margin given by HYSTEMP (1°C by default).
MINHUM	**Humidity is below min limit.** The alarm will be reset when the relative humidity rises above the limit with the margin given by HYSHUM (5% by default).
MINTEMP	**Temperature is below min limit.** The alarm will be reset when the temperature rises above the limit with the margin given by HYSTEMP (1°C by default).
NOPOWER	**Main power missing.** Triggers when the power has been missing by the number of minutes time given by PTIME (0 by default).
NOSENSOR	**No contact with environment sensor.**
VCCHI	**System Error:** Vcc is above maximum limit
VCCLO	**System Error:** Vcc is below minimum limit

8 Technical specifications



Product	**MiniCom® Guardian [Complete Kit CMC-1010-00-004]**
External Communication standard	GSM /SMS
Power supply (standard) **DC input voltage (optional)**	AC Adapter 230VAC -4,5VDC. / 2W 4,5 <VDC<7,5 V. Maximum input voltage 7,5V DC
CE	EN 61000-6-1 / 3 EN301489-1/7 EN 55022. LVD2006/95/EC
Dimensions (W x H x D)	Housing: 9 x 16 x 3 cm Sensor housing: 4 x 4 x 2 cm
Environment	Indoor, or inside approved outdoor cabinet. DIN rail mount.
System setup	SMS
Sensor (Included)	External sensor, temperature and humidity
Temperature Accuracy	Overall Temperature accuracy +/- 1,0 ℃ from -20 ℃ to +70 ℃ Guaranteed Temperature accuracy +/- 0,5 ℃ from +10 ℃ to + 40 ℃
Humidity Accuracy	20 -80 % rel humidity +/- 3 pp
Factory Settings	MINTEMP=18 MAXTEMP=26 MINHUM=10 MAXHUM=60
Temperature Operating Range (Sensor)	-30 ℃ - + 80 ℃
Humidity Operating Range (Sensor)	0 -100 % rel humidity (n.c .) +/- 7 pp
Operating Environment (MiniCom® Guardian)	0 - 40 ℃ Indoor. Outdoor in approved cabinet with heating
Display	3 x status LED
Keyboard	Single button operation
Battery Backup	Yes
Connection	RJ45 digital I/O